

## AMENDMENTS TO THE CLAIMS

### **1-19 (Canceled)**

**20 (Currently Amended)** A plasma etching method of performing plasma etching to an object made of silicon in a treatment chamber, said plasma etching method comprising:

introducing, into the treatment chamber, an etching gas which includes a fluorine compound gas and a rare gas;

energizing the etching gas into a plasma state by supplying electricity to the etching gas, the electricity having a frequency that is equal to or more than 27 MHz; and

etching the object using the plasma,

wherein the fluorine compound gas is one of sulfur hexafluoride ( $\text{SF}_6$ ) gas and nitrogen trifluoride ( $\text{NF}_3$ ) gas,

wherein the rare gas is helium (He) gas, ~~and~~

wherein a volumetric flow rate of the helium (He) gas introduced into the treatment chamber is equal to or more than 80% of a total volumetric flow rate of the etching gas, and

wherein the etching gas does not contain oxygen ( $\text{O}_2$ ) gas.

**21 (Currently Amended)** The plasma etching method according to Claim 20,

~~wherein the etching gas further includes one of oxygen ( $\text{O}_2$ ) gas, carbon monoxide ( $\text{CO}$ ) gas, and carbon dioxide ( $\text{CO}_2$ ) gas, and~~

wherein the fluorine compound gas is sulfur hexafluoride ( $\text{SF}_6$ ) gas.

### **22 (Canceled)**

### **23 (Canceled)**

**24 (Previously Presented)** The plasma etching method according to Claim 21,

wherein an inside wall of the treatment chamber is made of an insulating material.

**25 (Original)**            The plasma etching method according to Claim 24,  
wherein the insulating material is one of quartz, alumina, an aluminum matrix with  
alumite treatment, yttrium oxide, silicon carbide, and aluminum nitride.

**26 (Original)**            The plasma etching method according to Claim 21,  
wherein the etching gas further includes chlorine ( $\text{Cl}_2$ ) gas.

**27 (Previously Presented)**    The plasma etching method according to Claim 26,  
wherein a volumetric flow rate of the chlorine ( $\text{Cl}_2$ ) gas introduced into the treatment  
chamber is equal to or less than 10% of a total volumetric flow rate of the etching gas.

**28 (Canceled)**

**29 (Canceled)**

**30 (Original)**            The plasma etching method according to Claim 20,  
wherein the etching gas further includes polymer forming gas, and  
the fluorine compound is sulfur hexafluoride ( $\text{SF}_6$ ) gas.

**31 (Original)**            The plasma etching method according to Claim 30,  
wherein the polymer forming gas is one of octafluorocyclobutane ( $\text{C}_4\text{F}_8$ ) gas,  
trifluoromethane ( $\text{CHF}_3$ ) gas, octafluorocyclopentene ( $\text{C}_5\text{F}_8$ ) gas, and hexafluorobutadiene  
( $\text{C}_4\text{F}_6$ ) gas.

**32 (Currently Amended)**    The plasma etching method according to Claim 20,  
~~wherein the etching gas further includes one of oxygen ( $\text{O}_2$ ) gas, carbon monoxide ( $\text{CO}$ )~~

gas, and carbon dioxide ( $\text{CO}_2$ ) gas,

wherein the fluorine compound gas is sulfur hexafluoride ( $\text{SF}_6$ ) gas,

the etching gas comprises a first etching gas, and

etching the object using the plasma constitutes a first etching,

the method further comprising:

a second etching of the object after the first etching using a second etching gas which includes a polymer forming gas and sulfur hexafluoride ( $\text{SF}_6$ ) gas as a fluorine compound gas.

**33 (Previously Presented)** The plasma etching method according to Claim 20,

wherein the etching gas is energized into a plasma state by an inductively coupled plasma (ICP) method.

**34 (Original)** A device which etches a silicon substrate,

said device forming a trench in the silicon substrate using the plasma etching method according to Claim 20.

**35-37 (Canceled)**